

Social and Cognitive Functioning as Risk Factors for Suicide: A Historical-Prospective Cohort Study

Gad Lubin MD¹, Nomi Werbeloff PhD², Ronit Neidorf², Eyal Fruchter MD¹, Naama Rotem³, Abraham Reichenberg PhD⁵, Michael Davidson MD^{2,4}, Haim Y. Knobler MD¹, Mark Weiser MD^{1,2,4}

¹ Division of Mental Health, Medical Corps, IDF, Tel Hashomer, Military Mail 02149, Israel

² Department of Psychiatry, Sheba Medical Center, Tel Hashomer 52621, Israel

³ Israeli Central Bureau of Statistics, Jerusalem, Israel

⁴ Sackler School of Medicine, Tel Aviv University, Ramat Aviv, Israel

⁵ Institute of Psychiatry, King's College London, London, UK

Corresponding Author: Mark Weiser MD, Department of Psychiatry, Sheba Medical Center, Tel Hashomer, Israel, 52621.

mweiser@netvision.net.il

ABSTRACT

Objectives- Previous studies have shown that poor cognitive and social functioning are associated with increased risk of suicide. This study aimed to examine the association between social and cognitive functioning in adolescence and later completed suicide.

Design- Historical prospective cohort study

Setting and Participants- Data from the Israeli Draft Board Register for 756,223 Israeli male adolescents aged 16-17 was linked to a causes-of-death data registry, enabling up to 20 year follow-up (mean 10.4 year) for completed suicide (N=993). *Results-* Poorer cognitive and social functioning were both associated with increased risk of later suicide (adjusted HR=1.44, 95% CI: 1.18-1.76 and adjusted HR=2.3, 95% CI: 1.53-3.4, respectively). Regardless of their level of social functioning, adolescents who scored one point or more below their siblings on the social functioning scale had increased risk of later suicide (adjusted HR=1.41, 95% CI: 1.09-1.82). *Conclusions-* In adolescent males, poor cognitive and social abilities are associated with a slightly increased risk of later suicide. Male adolescents who function poorly compared to their brothers are also at increased risk for later suicide. These data underscore the importance of cognition and social abilities in understanding the phenomenon of suicide, and particularly indicate the significance of sibling rivalry in the etiology of suicide. However, because suicide is a rare event and poorer cognitive and social function in the general population is very prevalent, these characteristics are not useful as clinical predictors of suicide.

1.0 INTRODUCTION

Suicide is the third most common cause of death in individuals aged 15-44 years ¹, and is a complex outcome of multiple, inter-related genetic and environmental factors [2, 3]. Several investigators have studied the association between social isolation and risk of suicidal thoughts and behaviour [4-6]. Johnson et al. [7] reported that severe interpersonal difficulties, including difficulty making new friends, loneliness and interpersonal isolation, lack of close friends, and poor relationships with friends and peers, were significantly associated with risk for suicide attempts during late adolescence or early adulthood.

Report Documentation Page		Form Approved OMB No. 0704-0188
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.		
1. REPORT DATE APR 2011	2. REPORT TYPE N/A	3. DATES COVERED -
4. TITLE AND SUBTITLE Social and Cognitive Functioning as Risk Factors for Suicide: A Historical-Prosppective Cohort Study		5a. CONTRACT NUMBER
		5b. GRANT NUMBER
		5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER	
	5e. TASK NUMBER	
	5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Division of Mental Health, Medical Corps, IDF, Tel Hashomer, Military Mail 02149, Israel		8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)		10. SPONSOR/MONITOR'S ACRONYM(S)
		11. SPONSOR/MONITOR'S REPORT NUMBER(S)
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release, distribution unlimited		
13. SUPPLEMENTARY NOTES See also ADA578905. Mental Health and Well-Being across the Military Spectrum (Bien-être et santé mentale dans le milieu militaire). RTO-MP-HFM-205		
14. ABSTRACT Objectives- Previous studies have shown that poor cognitive and social functioning are associated with increased risk of suicide. This study aimed to examine the association between social and cognitive functioning in adolescence and later completed suicide. Design- Historical prospective cohort study Setting and Participants- Data from the Israeli Draft Board Register for 756,223 Israeli male adolescents aged 16-17 was linked to a causes-of-death data registry, enabling up to 20 year follow-up (mean 10.4 year) for completed suicide (N=993). Results- Poorer cognitive and social functioning were both associated with increased risk of later suicide (adjusted HR=1.44, 95% CI: 1.18-1.76 and adjusted HR=2.3, 95% CI: 1.53-3.4, respectively). Regardless of their level of social functioning, adolescents who scored one point or more below their siblings on the social functioning scale had increased risk of later suicide (adjusted HR=1.41, 95% CI: 1.09-1.82).Conclusions- In adolescent males, poor cognitive and social abilities are associated with a slightly increased risk of later suicide. Male adolescents who function poorly compared to their brothers are also at increased risk for later suicide. These data underscore the importance of cognition and social abilities in understanding the phenomenon of suicide, and particularly indicate the significance of sibling rivalry in the etiology of suicide. However, because suicide is a rare event and poorer cognitive and social function in the general population is very prevalent, these characteristics are not useful as clinical predictors of suicide.		
15. SUBJECT TERMS		

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT SAR	18. NUMBER OF PAGES 8	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			

Findings regarding cognitive functioning have been inconclusive, with some suggesting that those with higher IQ are more prone to suicide [8-12], while others reporting an inverse [13-16], or no [17] association between IQ and suicide. Gunnell et al. [14], in a cohort study of approximately one million Swedish men found that low cognitive functioning was strongly related to subsequent risk of suicide, and that the highest risk was found among those with low cognitive abilities whose parents were highly educated.

Most previous studies used suicidal ideation or attempts as the main outcome measure rather than completed suicide [4-7, 15]. Further methodological problems include relatively short follow-up [4, 5, 15], small sample size [12], and the use of ecological data rather than individual based data [9-11].

The purpose of this study was to examine the association between social and cognitive functioning and later completed suicide. Using a historical-prospective method, we utilized data routinely collected in a standardized method by the Israeli military Draft Board on a large cohort of Israeli male adolescents, including assessments of social and cognitive functioning. Later suicide was ascertained using the Israeli Death Registry, which includes records of all deaths in the country.

2.0 METHOD

2.1 Draft Board Assessment

All 16 to 17 years old Israeli males undergo cognitive, behavioral, and psychiatric assessments by the Draft Board in order to determine their eligibility and aptitude for military service. The cognitive test battery yields a total score which is a highly valid measure of general intelligence equivalent to a normally distributed IQ score. Tests are administered by a trained psychometrician. The cognitive assessment is comprised of four sub-tests: (a) Arithmetic - R, which assesses cognitive reasoning, concentration, and concept manipulation. This sub-test is similar to the 'arithmetic' sub-test from the Wechsler Intelligence Scales. The test is in a multiple-choice format and contains twice as many items, and therefore includes harder test items; (b) Similarities - R, which assesses verbal abstraction and categorization (i.e. the ability to understand the relationship between words and the use of this relationship in several contexts). This is a multiple-choice test. This test is a revised version of the 'similarities' sub-test from the Wechsler Intelligence Scale. Unlike the Wechsler test, subjects are requested not only to identify and report the semantic of causal relationships between the test items, but also to apply these relations to target items; (c) A spatial analogies test, which measures non-verbal abstract reasoning and problem-solving abilities. This test is also a multiple-choice test; (d) OTIS - R, a modified, Otis-type verbal intelligence test adapted from the US Army Alpha Instructions Test, which measures the ability to understand and carry out verbal instructions [18]. Tests are progressive, beginning with relatively simple items and becoming more difficult. Tests are group-administered and are time-limited. All scores are based on the number of correct answers. In the many validation studies conducted by the Draft Board, the summary score of the cognitive test battery has been found to be a highly valid measure of general intelligence [19].

After the cognitive assessments are performed, a semi-structured, thirty minutes, interview is held. The purpose of the interview is to assess personality and behavioral traits that will lead to an estimation of the conscript's suitability to military service, particularly service in combat units [19]. The interview is administered by trained enlisted individuals (most of them female soldiers) who participated in a 3 months training course. The interviewers are under constant supervision by senior interviewers and participate in ongoing training. The behavioral assessment, administered only to males, includes a subscale assessing social functioning. Based on structured questions, social functioning is then scored on a scale of 1-5: 1) Very poor: complete withdrawal, 2) Poor: weak interpersonal contacts, 3) Adequate: can form relationships with individuals and in a group, 4) Good: good interpersonal relationships and 5) Exceptional: superior interpersonal relatedness. The test-retest reliability of the behavioral assessment for

inductees interviewed after several days by different interviewers is above 0.8, and population-based norms are available [19, 20]. The draft board screening is described in detail in previous publications [17].

2.2 The Israeli Central Bureau of Statistics

For all deaths in the country, the treating physician must fill out a form describing all illnesses, and the cause of death. For cases of suicide, the method used is specified. The Israeli Central Bureau of Statistics receives these reports and encodes the causes of death, including suicide and method used, using standard ICD criteria. After receiving approval from the local IRB, the Draft Board data were linked to the death register, and the Central Bureau of Statistics provided mortality data including the causes and dates of deaths.

As in other similar studies [14], death by suicide was defined to comprise both those deaths which were officially classified as suicide/intentional self harm (ICD9 E950-959; ICD10 X60-84) and also deaths 'undetermined whether accidentally or purposely inflicted' (ICD9 E980-989; ICD10 Y10-34) [14]. This was done in order to reduce misclassification biases.

2.3 Study Population

Data was available on 875,097 Israeli male adolescents who were consecutively screened by the Israeli Draft Board. Our analyses are based on the 757,216 (87%) conscripts with complete data on both cognitive and social functioning. The 117,881 individuals with missing data had higher suicide rates than those with complete data (0.2% vs. 0.1%, $\chi^2=13.12$, $p<.001$). Of the conscripts included in the analyses, during a mean follow-up time of 10.4 years (SD=6 years), 993 (0.1%) were identified in the Central Bureau of Statistics as having committed suicide. These rates are compatible with the gender and age adjusted rates in Israel published annually by the Israeli Central Bureau of Statistics[21].

2.4 Statistical Analyses

As individuals assessed by the Draft Board were followed up to different ages, Cox regression analysis was used. Data on individuals with no record in the Death Registry were censored on the last day of follow-up, which was the date when the Draft Board data were merged with the Death Registry.

For purposes of analysis, cognitive functioning was categorized into three groups: 1 SD or more below population mean (low), 1 SD or more above population mean (high), and within 1 SD of population mean (normal). Social and cognitive functioning were entered into a Cox regression model once as the sole predictor, and then controlling for birth order. Immigration was not found to be associated with suicide, and thus was not entered as a covariate in the full model (see Table 1). Next, as suicide is strongly associated with mental disorders [22], we stratified the analyses according to the presence of psychiatric illness at the draft board assessment (available for 99% of the conscripts). For both social and cognitive functioning, the intermediate group (including the mean/median value) was used as the reference category. Regression analyses yielded hazard ratios and 95% confidence intervals.

In additional analyses we used data on socioeconomic status (SES) that was available for a sub-sample of 636,861 adolescents (of which 595 – 0.1% - committed suicide). A third regression model was fitted for this population, including SES as a covariate. The SES measure is derived from census data, based on the number of persons/room in the home, number of computers per household, number of motor vehicles per household, and per capita income level [23].

Finally, we identified a sub-group of adolescents for whom the social and cognitive data of siblings was available (N=403,416; 322 suicides). We used this data to assess whether cognitive and/or social

functioning significantly lower than one's siblings affected risk of later suicide, regardless of the absolute IQ or social functioning score of the conscript.

3.0 RESULTS

Unadjusted analyses revealed that both low and high cognitive functioning were associated with increased risk of later suicide (HR=1.36, 95% CI: 1.16-1.58 and HR=1.25, 95% CI: 1.05-1.48, respectively). Adjusting for birth order did not change these findings (adjusted HR=1.44, 95% CI: 1.18-1.76 and adjusted HR=1.25, 95% CI: 1.0-1.55, respectively). When stratifying the analysis by the presence of psychiatric illness at age 17, the association between IQ and later suicide held only for adolescents without mental illness (Table 1). We attempted to further stratify according to psychotic/non-psychotic disorder but this was not possible as there were only 3 psychotic individuals who later committed suicide. Similarly, both poor and high social functioning were associated with increased risk of later suicide (very poor SF: HR=2.41, 95% CI: 1.77-3.29, poor SF: HR=1.85, 95% CI: 1.6-2.15, exceptional SF: HR=1.65, 95% CI: 1.07-2.52). When adjusting for birth order, only those with poor social functioning were at risk for later suicide (very poor SF: adjusted HR=2.3, 95% CI: 1.53-3.29, poor SF: adjusted HR=1.65, 95% CI: 1.44-2.11). As with cognitive functioning, this association was only observed among adolescents without mental illness (Table 2). Results were similar when controlling for SES among the sub-sample for whom SES data was available (data not shown).

Table 1: Association between cognitive functioning and risk for suicide – stratified by psychiatric illness

	Mentally healthy conscripts				Mentally ill conscripts			
	No suicide (N=715,125)	Suicide (N=769)	HR (95% CI)	Adjusted* HR (95% CI)	No suicide (N=35,285)	Suicide (N=85)	HR (95% CI)	Adjusted* HR (95% CI)
Low	16.5%	20.2%	1.37 (1.14-1.64)	1.39 (1.1-1.76)	40.5%	36.5%	1.02 (0.41-2.57)	0.99 (0.53-3.1)
Normal	68.5%	62.8%	1	1	53.6%	57.6%	1	1
High	15.0%	17.0%	1.22 (1.01-1.49)	1.23 (0.96-1.58)	5.9%	5.9%	0.86 (0.55-1.35)	1.03 (0.62-1.68)

*Adjusted for birth order

Table 2: Association between social functioning and risk for suicide in crude and birth order – stratified by psychiatric illness

	Mentally healthy conscripts				Mentally ill conscripts			
	No suicide (N=715,125)	Suicide (N=769)	HR (95% CI)	Adjusted* HR (95% CI)	No suicide (N=35,285)	Suicide (N=85)	HR (95% CI)	Adjusted* HR (95% CI)
Very poor	1.8%	3.8%	3.03 (2.08-4.42)	2.46 (1.43-4.21)	14.7%	10.6%	0.77 (0.37-1.61)	0.83 (0.38-1.83)
Poor	17.1%	27.0%	1.95 (1.65-2.31)	1.81 (1.46-2.26)	39.5%	44.7%	1.04 (0.65-1.66)	0.86 (0.5-1.48)
Adequate	58.4%	49.5%	1	1	35.8%	37.6%	1	1
Good	20.7%	17.1%	1.03 (0.85-1.26)	0.96 (0.74-1.23)	8.9%	5.9%	0.67 (0.26-1.72)	0.83 (0.32-2.15)
Exceptional	2.0%	2.6%	1.89 (1.21-2.97)	1.65 (0.9-3.03)	1.1%	1.2%	1.29 (0.18-9.43)	0.91 (0.42-2.7)

*Adjusted for birth order

3.1 Siblings

Scoring one point or more below one's brothers on the social functioning scale significantly increased the risk of later suicide (Table 3), irrespective of the conscript's absolute social functioning score. No such association was observed between poorer scoring on the cognitive functioning scale and later suicide.

Table 3: Risk for suicide by social and cognitive differences between siblings

		HR (95% CI)	Adjusted* HR (95% CI)
IQ	Within 1 SD of brothers	1	1
	1 SD or more above brothers	0.94 (0.66-1.33)	0.92 (0.65-1.31)
	1 SD or more below brothers	1.06 (0.76-1.5)	1.1 (0.77-1.52)
Social Functioning	Within 1 point of brothers	1	1
	1 point or more above brothers	1.19 (0.91-1.56)	1.18 (0.9-1.55)
	1 point or more below brothers	1.42 (1.09-1.83)	1.41 (1.09-1.82)

*Adjusted for birth order

4.0 DISCUSSION

The main finding of this paper is the association between poor social and cognitive functioning in adolescents aged 17-21 and the risk of later suicide. Adolescents functioning at high levels were also at increased risk, though this was attenuated or no longer significant when controlling for birth order.

To our knowledge, this association between poor social functioning and later suicide has never been published before. Some authors reported a correlation between suicidality and different variables related to social functioning, such as family and friend's support, social isolation, emotional neglect [3], number of close friends [24], marital status [17], and number of children [25]. Our subjects were followed for completed suicide, and their social functioning was prospectively assessed systematically and graded [19]. One might speculate that at least some of the persons with poor social functioning are at increased risk for completed suicide because they are subject to rejection by their peers. Another related possibility is that this poor social functioning reflects poor social skills, which might be a source of stress and hence suicidality. However, the data presented here do not enable us to examine this hypothesis.

The findings regarding cognitive functioning are similar. Lower IQ predicted higher rates of suicide later in life. This is consistent with previous reports of a negative correlation between IQ and risk of suicide [17]. This can partly be explained by the known finding that low IQ is a predictor of future psychiatric illness, a known risk factor for suicide [26], however this finding remained significant when examining persons without psychiatric illness. The hazard ratio (1.37, CI: 1.11-1.69) is also consistent with previous cohort studies [13, 15]. One might speculate that being less intelligent in today's world is a source of constant stress, which might then lead to suicidality. A trend towards high suicide risk in subjects with high IQ was also found. A similar association between high IQ and risk for suicide was previously reported in several studies [8-11]. It is harder to explain this finding, given that in most studies high IQ is associated with positive outcomes such as low mortality risk [27].

Gunnell et al. [14] compared the intelligence of subjects to that of their parents (using parents' years of education as a proxy) and concluded that in cases where the parent performed better than the offspring, higher suicide risk was evident. In the current analysis on siblings we did not replicate this finding

regarding IQ but did find that scoring significantly lower than one's siblings on the social functioning scale slightly but significantly increased risk for later suicide (Table 2). It is plausible that the stress that such gaps in social functioning impose may cause sibling rivalry and envy, and thus increase frustration and risk of later suicide.

4.1 Limitations

This study uses data collected on adolescents inducted to the military; thus, lower functioning adolescents considered not fit to be drafted, including those with severe psychiatric disorders, are not included in these data. However, these excluded adolescents have lower scores on the cognitive and social tests administered by the draft board (data not shown), and higher risk of suicide [28]; hence their exclusion probably leads to an underestimation of the association between cognitive and social abilities and later suicide. In addition, since the information we have on the subjects was collected between the ages of 17 to 21, we only know of cognition, social functioning and psychiatric illness recorded during this period. It is possible that some of these individuals were later diagnosed with mental illness, a possibility we could not control for. A third important limitation is that completed suicides as drawn from the registry are probably an underestimation of actual suicide rates [29].

5.0 CONCLUSION

In summary, in adolescent males, poor cognitive and social abilities are associated with increased risk of later suicide. Male adolescents whose social functioning is poorer than that of their siblings are also at increased risk for later suicide. These data underscore the importance of cognition and social abilities in understanding the phenomenon of suicide, and particularly indicate the significance of sibling rivalry in the etiology of suicide. However, due to the low prevalence of suicide, these characteristics do not enable prediction of later suicide.

6.0 REFERENCES

1. WHO. *Multisite Intervention Study On Suicidal on Behaviours-Supre-Miss*: 2002. Department of Mental Health and Substance Dependence. World Health Organization: Geneva.
2. Mann, J.J., *A current perspective of suicide and attempted suicide*. Ann Intern Med, 2002. **136**(4): p. 302-11.
3. Moscicki, E.K., *Identification of suicide risk factors using epidemiologic studies*. Psychiatr Clin North Am, 1997. **20**(3): p. 499-517.
4. Bearman, P.S. and J. Moody, *Suicide and friendships among American adolescents*. Journal of Public Health, 2004. **94**(1): p. 89-95.
5. Haynie, D.L., S.J. South, and S. Bose, *Residential mobility and attempted suicide among adolescents: An individual-level analysis*. Sociological Quarterly, 2006. **47**(4): p. 693-721.
6. Roberts, R.E., C.R. Roberts, and Y.R. Chen, *Suicidal thinking among adolescents with a history of attempted suicide*. J Am Acad Child Adolesc Psychiatry, 1998. **37**(12): p. 1294-300.
7. Johnson, J.G., et al., *Childhood adversities, interpersonal difficulties, and risk for suicide attempts during late adolescence and early adulthood*. Arch Gen Psychiatry, 2002. **59**(8): p. 741-9.
8. Apter, A., et al., *Fatal and non-fatal suicidal behavior in Israeli adolescent males*. Arch Suicide Res, 2008. **12**(1): p. 20-9.
9. Voracek M., *Smart and suicidal? The social ecology of intelligence and suicide in Austria*. Death Stud, 2006. **30**(5): p. 471-85.
10. Voracek, M., *Regional intelligence and suicide rate in Denmark*. Psychol Rep, 2006. **98**(3): p. 671-4.
11. Voracek, M., *National intelligence and suicide rate across Europe: an alternative test using educational attainment data*. Psychol Rep, 2007. **101**(2): p. 512-8.
12. Milling, L., et al., *Preadolescent suicidal behavior: the role of cognitive functioning*. Child Psychiatry Hum Dev, 1997. **28**(2): p. 103-15.
13. O'Toole, B.I. and C. Cantor, *Suicide risk factors among Australian Vietnam era draftees*. Suicide Life Threat Behav, 1995. **25**(4): p. 475-88.
14. Gunnell, D., P.K. Magnusson, and F. Rasmussen, *Low intelligence test scores in 18 year old men and risk of suicide: cohort study*. Bmj, 2005. **330**(7484): p. 167.
15. Jiang, G.X., F. Rasmussen, and D. Wasserman, *Short stature and poor psychological performance: risk factors for attempted suicide among Swedish male conscripts*. Acta Psychiatr Scand, 1999. **100**(6): p. 433-40.
16. Osler, M., A.M. Nybo Andersen, and M. Nordentoft, *Impaired childhood development and suicidal behaviour in a cohort of Danish men born in 1953*. J Epidemiol Community Health, 2008. **62**(1): p. 23-8.
17. Loibl LM, Voracek M. Psychometric properties and correlates of the Lester-Bean Attribution of Causes to Suicide Scale (German form). *Psychol Rep* 2007;101(1):47-52.
18. Lezak, M.D., *Neuropsychological assessment*. third ed 1995, New-York: Oxford University Press.
19. Gal, R., *The Selection, Classification and Placement Process: A Portrait of the Israeli Soldier* 1986, Westport, Conn: Greenwood Press.
20. Reeb, M., *Construction of questionnaire to replace a valid structured interview in the Israeli Defense Forces*. Megamot Behavioral Sciences Quarterly 1968. **16**: p. 69-74.
21. Statistics, C.B.o., *Statistical Abstract of Israel*. The state of Israel.
22. Harris, E.C. and B. Barraclough, *Suicide as an outcome for mental disorders. A meta-analysis*. Br J Psychiatry, 1997. **170**: p. 205-28.
23. Statistics, C.B.o., *Central Bureau of Statistics. Demographic Characteristics of the Population in Localities and Statistical Areas*, C.B.o. Statistics, Editor 1995, Ministry of the Interior: Jerusalem.
24. King, C.A. and C.R. Merchant, *Social and interpersonal factors relating to adolescent suicidality: a review of the literature*. Arch Suicide Res, 2008. **12**(3): p. 181-96.

25. Maris, R.W., *Social and familial risk factors in suicidal behavior*. Psychiatr Clin North Am, 1997. **20**(3): p. 519-50.
26. Beautrais, A.L., et al., *Prevalence and comorbidity of mental disorders in persons making serious suicide attempts: a case-control study*. Am J Psychiatry, 1996. **153**(8): p. 1009-14.
27. Whalley, L.J. and I.J. Deary, *Longitudinal cohort study of childhood IQ and survival up to age 76*. Bmj, 2001. **322**(7290): p. 819.
28. Westermeyer, J.F., M. Harrow, and J.T. Marengo, *Risk for suicide in schizophrenia and other psychotic and nonpsychotic disorders*. J Nerv Ment Dis, 1991. **179**(5): p. 259-66.
29. Bertolote, J.M. and A. Fleischmann, *A global perspective in the epidemiology of suicide*. Suicidologi, 2002. **7**: p. 6-8.